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The Business of Restoration: A Profile of Restoration Contractors in Oregon

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From about World War II to the mid-1990s, forest management in Oregon was focused around timber management on public and private lands. It included labor-intensive reforestation and precommercial thinning, equipment-intensive road building and maintenance, and technical activities such as surveying and timber cruising. Similarly, watershed management involved changing streams to provide water to agricultural and urban users, control floods, and also provide hydroelectric power. Watershed management included activities such as stream channelization, road maintenance, and building and maintenance of dams for irrigation and hydroelectric generation. However, over the past fifteen years, natural resource management has shifted toward restoration of ecological functions of forests and watersheds, particularly on federal lands but also increasingly on private lands and streams.

Forest restoration activities include thinning and other vegetation management to restore habitat, foster late successional forest structures, and reduce fire hazard; noxious weed control; and road maintenance and decommissioning. Watershed restoration activities include riparian planting to increase cool river temperatures, in-stream work to create fish habitat, road and culvert work to improve fish passage and reduce sedimentation, and irrigation improvements to restore in-stream water. Forest and watershed restoration also includes planning, design, and monitoring of on-the-ground restoration projects

Federal land management agencies and private landowners have long contracted with businesses, commonly called contractors, to perform forest and watershed management work and have continued to do so as their management emphasis has shifted to restoration work. Over the past fifteen years in Oregon, local nongovernmental organizations such as watershed councils have also emerged and also contract for forest and watershed restoration along with public and private landowners.¹

Due to the significant shift in the way public and private lands are being managed and the rise of community-based organizations such as watershed councils, it seems likely that the businesses engaged in forest and watershed work have changed as well. Although restoration is similar to other kinds of forest and watershed management, changes in management emphasis may affect the



businesses that provide these services, and new demands have likely shifted the business opportunities and types of businesses performing these services. Yet relatively little is known about the businesses that perform forest and watershed management.

The purpose of this paper is to profile the businesses engaged in forest and watershed management. We compare contractors based on their primary customer base (federal versus nonfederal) as well as the type of work that they perform (labor-intensive, equipment-intensive, and technical). We consider a number of business attributes such as the importance of restoration in their business model, size, ownership type, age, and their experiences with the changing marketplace for forest and watershed work.

Methods

To develop a profile of the forest and watershed restoration industry, we surveyed 190 business owners

and managers of businesses that have contracted with watershed councils, local government, and federal land management agencies to perform restoration in Oregon in recent years. We developed a stratified sample of 220 contractors that had worked for the U.S. Forest Service, Bureau of Land Management, and U.S. Fish and Wildlife Service from fiscal years 2002 through 2008 and 101 contractors that had worked for watershed councils in Oregon during same period. We ultimately surveyed 190 contractors for a response rate of 49 percent of federal and 45 percent of watershed council contractors.

We asked business owners and managers information about their business, including its age, the type of work they perform, average annual revenue, and whether the business is family-owned. We also asked business owners and managers about the major type of work they perform, level of involvement in the restoration industry, seasonality of their work as well as about how frequently they work far from home. To conclude, we asked a series of open-ended questions about how the forest and watershed management industry has changed in recent years, and how their business has responded to those changes.

We created two typologies of forest and watershed management contractors. First, we divided contractors based on their dominant customers into those that worked primarily for federal agencies, those that worked primarily for nonfederal entities, and those that worked about equally for federal and nonfederal entities. We expected differences in the type of contractors working for the different types of customers primarily due to the level of formality in the prescribed federal contracting system compared to nongovernmental contracting, and because of the long-standing federal use of forest and watershed management contractors. By contrast, private landowners and community-based organizations may have less formal contracting systems and, in the case of community-based organizations, are newer to forest and watershed management contracting, which may attract different kinds of businesses and business models. Second, we created a typology of contractors based on the primary type of work that they performed—labor-intensive, equipment-intensive, technical, and mixed. Previous research suggests that there are differences in the types of businesses based on the type of work that they perform.² We used these two typologies to differentiate groups of

contractors participating in Oregon's forest and watershed management sector. Using each of these typologies, we examined the proportions and means of a variety of other variables to investigate differences among contractors. A detailed description of the methods for the study is located in the appendix.

Findings

BUSINESS TYPOLOGY

Primary customers

Although our sample of forest and watershed management contractors came from both federal and nonfederal sources, many of the business owners and managers we interviewed provide services for both federal and nonfederal customers. Of the 180 business owners and managers who responded, fifty-two (29 percent) worked predominately for the federal government, eighty-five (47 percent) worked mostly for nonfederal customers, and forty-three (24 percent) worked about equally for federal and nonfederal customers. When compared to federally focused contractors, those working predominantly with nonfederal entities (or working with a mix of the two) were more likely to 1) be older businesses, 2) be family owned, 3) focus on equipment or technical work, 4) perform forest and watershed restoration work as a supplement to their main business activities, 5) and work frequently close to home (Table 1).

Dominant work type

Although many contractors responded that their businesses require a variety of types of work, fifty-five (29 percent) primarily did labor-intensive work, seventy (37 percent) primarily did equipment-intensive work, twenty-seven (14 percent) primarily did technical work, and thirty-seven (20 percent) did an approximately equal mix of two or three types. Compared to others, businesses that primarily did labor-intensive work were the youngest, more commonly worked for the federal government, and made the greatest amount of their revenue from forest and watershed management (Table 2). Businesses that did technical work typically had smaller total revenues, with 85 percent making less than \$1 million in annual revenue for the past three years. Businesses that

Table 1. A comparison of characteristics among contractors, based on the majority of revenue coming from federal, nonfederal, or a mix of customers.

Characteristics	All	Work predominantly for federal agencies	Work predominantly for nonfederal entities	Work with a mix of customers
Number of responses (n)***	180	52	83	42
Average business age*	22 years	17 years*	24 years*	24 years
Sole proprietorship	51 (28%)	18 (35%)	24 (28%)	9 (21%)
Family-owned business	130 (73%)	34 (65%)	63 (76%)	33 (77%)
Small business: <\$1M Rev [explain]	123 (68%)	42 (81%)	52 (61%)	29 (67%)
Seasonality of business	154 (86%)	46 (88%)	68 (80%)	35 (81%)
Average employment range ¹	11–27 jobs	19–45 jobs	8–20 jobs	8–20 jobs
Work performed**				
Labor-intensive	53 (29%)	26 (50%)	19 (22%)	8 (19%)
Equipment-intensive	68 (38%)	16 (31%)	33 (39%)	19 (44%)
Technical	26 (14%)	3 (6%)	14 (16%)	9 (21%)
Mixed	33 (18%)	7 (13%)	19 (22%)	7 (16%)
Revenue from forest and watershed management ***				
	(n=179)			
>90%	64 (36%)	29 (56%)	19 (22%)	16 (38%)
75–90%	8 (4%)	3 (6%)	3 (4%)	2 (5%)
50–75%	13 (7%)	4 (8%)	5 (6%)	4 (10%)
25–50%	23 (13%)	6 (12%)	13 (15%)	4 (10%)
10–25%	26 (15%)	5 (10%)	11 (13%)	10 (24%)
< 10%	45 (25%)	5 (10%)	34 (40%)	6 (14%)
Work within daily commuting range **				
	(n=173)			
> 90% of the time	81 (47%)	16 (31%)	51 (63%)	14 (34%)
75–90% of the time	24 (14%)	5 (10%)	9 (11%)	10 (24%)
50–75% of the time	18 (10%)	6 (12%)	9 (11%)	3 (7%)
25–50% of the time	12 (7%)	4 (8%)	5 (6%)	3 (7%)
10–25% of the time	13 (8%)	8 (16%)	1 (1%)	4 (10%)
< 10% of the time	25 (14%)	12 (24%)	6 (7%)	7 (17%)
Hire local workers when working away from home				
	25 (17%)	10 (21%)	11 (18%)	4 (10%)
Equipment ownership	154 (85%)	43 (83%)	74 (88%)	34 (85%)

Note 1: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Note 2: Respondents were asked how many people worked for the business during the previous high and low seasons.

Table 2. Comparison of characteristics businesses across predominate work types.

<i>Characteristics</i>	<i>All Contractors</i>	<i>Primarily labor intensive</i>	<i>Primarily equipment intensive</i>	<i>Primarily technical</i>	<i>Mixed</i>
Number of responses (n)***	189	55 (29%)	70 (37%)	27 (14%)	37 (20%)
Average business age	23 years	21 years	24 years	22 years	23 years
Sole proprietorship	53 (28%)	14 (25%)	19 (27%)	10 (37%)	10 (27%)
Family-owned business	135 (71%)	35 (64%)	55 (79%)	16 (59%)	29 (78%)
Small business: <\$1M Rev [explain]	125 (66%)	36 (65%)	25 (60%)	23 (85%)	24 (65%)
Business is seasonal	154 (81%)	43 (78%)	56 (81%)	20 (74%)	35 (95%)
Average employment range ²	11–27 jobs	11–42 jobs	14–23 jobs	7–11 jobs	8–23 jobs
Dominant customer**	(n=180)				
Federal agencies	52 (29%)	26 (49%)	16 (24%)	3 (12%)	7 (21%)
Nonfederal entities	85 (47%)	19 (36%)	33 (49%)	14 (54%)	19 (58%)
Mixed	43 (24%)	8 (15%)	19 (28%)	9 (35%)	7 (21%)
Revenue from forest and watershed management	(n=184)				
>90%	64 (35%)	25 (47%)	16 (23%)	11 (42%)	12 (33%)
75–90%	8 (4%)	4 (8%)	2 (3%)	1 (4%)	1 (3%)
50–75%	13 (7%)	3 (6%)	5 (7%)	2 (8%)	3 (8%)
25–50%	24 (13%)	5 (9%)	12 (17%)	2 (8%)	5 (14%)
10–25%	26 (14%)	6 (11%)	9 (13%)	7 (27%)	4 (11%)
< 10%	49 (27%)	10 (19%)	25 (36%)	3 (12%)	11 (31%)
Work within daily commute	(n=179)				
> 90% of the time	87 (49%)	26 (49%)	26 (41%)	13 (48%)	22 (61%)
75–90% of the time	24 (13%)	4 (8%)	12 (19%)	3 (11%)	5 (14%)
50–75% of the time	18 (10%)	6 (11%)	7 (11%)	3 (11%)	2 (6%)
25–50% of the time	12 (7%)	3 (6%)	5 (8%)	2 (7%)	2 (6%)
10–25% of the time	13 (7%)	6 (11%)	3 (5%)	3 (11%)	1 (3%)
< 10% of the time	25 (14%)	8 (15%)	10 (16%)	3 (11%)	4 (11%)
Hire local workers when working away from home	25 (17%)	10 (19%)	6 (11%)	3 (15%)	6 (25%)
Equipment ownership	154 (85%)	47 (87%)	58 (87%)	20 (80%)	29 (83%)

Note 1: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Note 2: Respondents were asked how many people worked for the business during the previous high and low seasons.

primarily did equipment, technical, or mixed work most commonly worked for nonfederal entities. Finally, most equipment and mixed-work businesses made less than half of their revenue from forest and watershed restoration work.

Relationship between primary customer and dominant work type

Of the fifty-two businesses that worked primarily for the federal government, twenty-six (50 percent) were labor-intensive businesses (Table 3). Likewise, these twenty-six businesses comprised approximately 49 percent of the labor-intensive businesses. Of the eighty-five businesses that work primarily for nonfederal entities, thirty-three (39 percent) did equipment-intensive work. These thirty-three businesses also comprised approximately half (49 percent) of all equipment-intensive businesses. Of the businesses that work for an even mix of customers, nineteen (44 percent) did equipment work, and fourteen (54 percent) of the technically intensive businesses work primarily for nonfederal entities. Last, nineteen (58 percent) of those businesses that do an even mix of work types worked for nonfederal entities. Technical businesses were the most likely to have a nonfederal customer base.

BUSINESS CHARACTERISTICS

Role of forest and watershed restoration and management in business model

We asked contractors what percentage of their revenue came from forest or watershed management and restoration work over the last three years. Fewer than half of businesses made the majority of their revenue from forest and watershed work, with seventy-five (41 per-

cent) making less than one quarter of their total revenues from forest and watershed work. On the other hand, seventy-two (39 percent) made more than three-quarters of their annual revenue from forest and watershed work. Contractors who worked primarily for the federal government were most likely to specialize in forest and watershed work, with thirty-two (62 percent) earning more than three-quarters of their annual revenue from this source. Contractors who had primarily nonfederal customers were less likely to concentrate on forest and watershed restoration work, with forty-five (53 percent) earning less than one-quarter of annual revenues from this source. Contractors with an even mix of customers were split between the eighteen (43 percent) that earn more than three-quarters of their annual revenues from forest and watershed work and the sixteen (38 percent) that earn less than one-quarter of their annual revenue from this source. Although only significant at the alpha equals 0.10 level ($p = 0.08$), labor-intensive contractors were more likely, and equipment-intensive contractors the less likely, to concentrate their businesses in forest and watershed restoration work. Of labor-intensive contractors, 55 percent make more than three-quarters of their annual revenue from restoration work, while only 49 percent of equipment-intensive contractors make less than one-quarter of their annual revenue from forest and watershed work. Technical and mixed-work businesses were more bimodal with roughly equal numbers of businesses in the greater than three-quarters and less than one-quarter of annual revenue from forest and watershed work categories.

Business size, ownership, and age

All but two of the businesses we interviewed fit the Small Business Administration's (SBA) definition of small businesses. The SBA definition of a small business

Table 3. Relationship between primary customer and dominant work.

	<i>Federal agencies</i>	<i>Nonfederal entities</i>	<i>Even mix of federal and nonfederal</i>	<i>Total</i>
<i>Labor-intensive</i>	26	19	8	53
<i>Equipment-intensive</i>	16	33	19	68
<i>Technical</i>	3	14	9	26
<i>Even mix of work types</i>	7	19	7	33
<i>Total</i>	52	85	43	180

$N = 180; p < 0.01$

varies by economic sector and is generally based on annual revenue. Ranges vary from \$7 million for activities supporting agriculture and forestry to \$33.5 million for road and heavy construction. To offer a more nuanced accounting of the businesses we interviewed, we asked for a more detailed breakdown of annual revenues, particularly for those businesses with annual revenues of less than \$1 million. A total of 125 (70 percent) businesses had less than \$1 million in revenues. Of those with annual revenues less than \$1 million, nearly half had annual revenues less than \$250,000. Only seven (4 percent) reported annual revenues greater than \$7 million. We found no relationship between business revenues and primary customer or dominant work types.

The business owners and managers of 135 (72 percent) businesses we interviewed considered their businesses to be family-owned. Corporations, 126 (68 percent), were the most common organizational structure (many are S corporations or limited liability corporations), whereas fifty-one (28 percent) were sole proprietorships. Although the age of businesses ranged from one to 105 years, half of all businesses we interviewed were more than twenty years or older, with a mean of twenty-three years.

There is no relationship between family ownership or business ownership structure and the businesses' dominant customers or primary work types. Although the average age of all businesses was twenty-three years old, those businesses that worked for nonfederal entities had been established on average over seven years more than those that work primarily for the federal government ($p < 0.05$). However, the business' dominant type of work did not bear on the age of the business.

Seasonality

The majority of businesses that we interviewed—154 (86 percent)—experienced seasonal fluctuations of employment and work. Employment was lower during the winter season, with 122 (68 percent) hiring the fewest employees during that time and 116 (64 percent) hiring the greatest number of employees in the summer. Employment varied significantly ($p < 0.001$) between the high and low seasons, with low-season employment averaging about eleven employees per business and high-season

employment averaging about twenty-seven employees per business (with half the businesses between two and seven employees from low to high seasons). We found no relationship between seasonality variables and a business' primary customer or dominant work types.

Travel to work

We asked business owners and managers what percent of their business is within the daily commuting distance of their office (a distance from which workers can return home for the night, typically less than two hours away). For most of the time, the majority of businesses worked close to home: eighty-seven (49 percent) businesses did more than 90 percent of the work within commuting distance, and 129 (72 percent) worked within commuting distance more than half the time. However, a small but notable number of businesses—twenty-five (14 percent)—worked away from home more than 90 percent of the time.

Businesses working primarily for the federal government were more likely to travel to and stay at or near the job site than those businesses working for nonfederal or an even mix of clients. Nearly half of businesses working primarily for the federal government—twenty-four (47 percent)—work more than half of the time away from home. In contrast, sixty-nine (85 percent) businesses working primarily for nonfederal entities and twenty-seven (66 percent) businesses working for an even mix of customers worked within commuting distance of their home office more than half of the time. We found no relationship between commuting patterns and a business' dominant work type.

Sourcing workers and equipment

We also asked contractors whether they brought their own workers with them or hired local workers when they traveled away from home. In answering, 126 (83 percent) respondents reported that they typically brought their own workers with them to the job sites. Only six (4 percent) businesses reported exclusively hiring local workers. The remaining nineteen (13 percent) respondents used a mix of their own and local workers. Respondents most commonly reported that bringing their own workers reduced the needs for training and that it was challenging to find qualified temporary workers lo-

cally. For those businesses that used a mix of both their own workers and local workers, they reported that the majority of their workers were brought with them, but that they may hire local workers to do manual labor or jobs not requiring experience.

Most businesses—154 (85 percent)—primarily owned the equipment that they used while conducting forest and watershed management and restoration work. Of the remaining 15 percent of businesses we interviewed, seventeen utilized a mix of owned, rented, or leased equipment; five only rented or leased equipment; and five reported that their clients typically supplied their equipment. Of those businesses that generally owned most of their equipment, some mentioned that they occasionally rented specialized equipment for specific jobs. We found no relationship between how businesses source labor and equipment and a business' primary customer or dominant work types.

Identifying work

All contractors typically identified work through informal channels. Of those who responded, 130 (79 percent) contractors said that they identified potential work opportunities through word of mouth or were solicited by project sponsors. Many contractors, particularly in rural areas, said that they were known for the kind of work that they did in their area and were often contacted to do the work or bid on the projects. By contrast, sixty-four (39 percent) businesses used the federal contracting website³ and fifty-four (33 percent) used newspapers or trade journals to identify job opportunities. When not contacted directly for jobs, many business owners and managers reported finding more opportunities via Internet sources than print sources.

Approximately 66 percent of the businesses that worked primarily for the federal government identified the federal contracting website as a major source of work opportunities.³ Only 56 percent of those businesses identified word of mouth or solicitations from project sponsors as an important source for work opportunities. By contrast, of those businesses that worked primarily for nonfederal entities or an even mix of entities, 86 percent and 90 percent, respectively, reported that important sources of work opportunities often came from word of mouth or

through solicitations from project sponsors. We found no relationship between how businesses identified work opportunities and a business' dominant work type.

Changes in work opportunities

When asked whether restoration work opportunities had increased or decreased over the last ten years, sixty-six (40 percent) respondents thought that work opportunities had increased while sixty-six (40 percent) respondents also thought that their opportunities had decreased. Only thirty-two (20 percent) felt as though opportunities had remained the same. Although the same proportion of respondents perceived both an increase and a decrease in work opportunities, the type of response depended heavily on a contractor's primary customer type.

Of the contractors that worked primarily for federal customers, only fourteen (28 percent) perceived an increase in forest and watershed work opportunities, while twenty-three (46 percent) thought that their opportunities had decreased. Approximately one quarter (thirteen respondents) perceived no change in opportunities. Among those contractors that work primarily for nonfederal customers, the pattern was reversed: thirty-nine (52 percent) perceived an increase in their opportunities for forest and watershed work, while only twenty-seven (36 percent) perceived a decrease. Of those respondents working primarily for nonfederal customers, only nine (12 percent) perceived no change in their opportunities.

Although only significant at the $\alpha = 0.10$ level, business owners' and managers' perceptions of trends in work opportunities also varied depending on the dominant work type of the business. Businesses that performed mostly technical work or an even mix of work types were nearly twice as likely to perceive an increase in forest and watershed work opportunities compared to labor- and equipment-intensive businesses. In contrast, approximately 45 percent of businesses that performed mostly labor or equipment work perceived a decrease in work opportunities.

We asked business owners and managers to describe the different types of changes they have experienced in forest and watershed work. Many discussed a decline in forest management and logging, an increase in watershed

management opportunities such as stream restoration, and an increase in the complexity and regulations associated with forest and watershed management more generally.

Forest management and logging

Contractors that discussed forest management reported that logging and reforestation had declined, particularly on federal lands. Contractors responded that the decline in logging and especially clear cutting on federal lands has had repercussions in the forestry services sector, leading to a decline in reforestation as well as surveys. One technical contractor explained as follows:

The Forest Service no longer cuts timber and our work was primarily project-driven. So . . . no timber sales equals no surveys. The amount of work has fallen off precipitously (901340025).

Many respondents related falling timber markets to decreases in work opportunities in the forests and the need to find jobs in other areas. Some contractors explained that they were still able to keep busy with forest management work by changing the activities that they focused on. The owner of one forestry business explained:

There is a change in the type of work being done. There is a lot of thinning. No clear-cut or regenerative harvest going on (899404633).

Although many forestry contractors agreed that there were fuels-management opportunities, they noted that this shift from logging and reforestation work has increased the competition for such projects. Many of these respondents mentioned increased competition, drastically lowered bids, increased Hispanic labor, and a decrease in local workers.

There are more people in the woods looking for things to do like thinning and piling (893172731).

There are less jobs and more competition. Workers see the opportunities and then start their own businesses—that is how we got started (894133292).

Now, you really need to do a lot of bidding, and you have to keep your price low if you want to work.

People are getting into this because they see the opportunity; basically, foremen try and start their own businesses once they get some training. Some make it, some don't (904728537).

Watershed management

In contrast to logging and reforestation, the general consensus was that watershed management opportunities have increased. Many contractors indicated that they have transitioned to more watershed-related work.

Because of the decrease in timber harvest, there is less planting, which means less tree nursery work. Wetland restoration work has been on the increase over the last few years (913082464).

In-stream work has increased dramatically. The logging work has declined, since there are no timber sales like there used to be . . . but most of the private lands are accessible (904959867).

The big change is the logging; we have switched over to doing timber stand exams. Still doing stewardship and management plans on the ground, just not implementing them. The restoration work has allowed our business to continue to function (933723990).

Respondents repeatedly mentioned increases in work opportunities for fish habitat, culvert replacements, riparian plantings, and wetland and watershed restoration.

We have done a lot of restoration work in the last ten years; it's been our main focus. There are plenty of opportunities. Adequate opportunities. The main limitation is the fish passage window and the fluctuations in funding (916600089).

Changing requirements of forest and watershed management

Contractors also frequently discussed changes in the scope, requirements, and regulations of forest and watershed management. In general, many contractors felt that “the work is becoming more complex as engineers determine what does and does not work” (911992499), and that “more ecological factors are considered in planning

as well as implementing the work” (899926471). One contractor noted, “The changes that I have seen, in terms of availability of work—work is getting more technical and the science behind it improves, the expectations are higher because they understand it more” (934078798).

There is more [land] development, which creates demand for wetland delineation, especially in Oregon. So many of the agencies and regulators are environmentally minded [that] the work is getting more and more technical and there are fewer folks that are able to accomplish this work. I went from sampling seven sites within the project to doing thirty. All of the policies have tightened up, the resources haven’t really improved or deteriorated, they are just increasing the regulation and technical reporting (921082588).

According to contractors, as the ecological, environmental, and technical knowledge regarding forest and watershed restoration work increases, rules and regulations for the work have also increased. This has led to stricter regulations such as tighter in-water work periods, a stricter enforcement regarding low-impact work, and an increased demand for technical data and contractors.

Changes in Business Strategies

When asked how they were changing their businesses in responses to changes in the forest and watershed management industry, most respondents said that they had moved into different types of work. Those who felt that opportunities had declined described the need to diversify their range of work to stay in business, and those who felt as though opportunities had increased described the desire to expand their ability to tap into those opportunities.

Diversification often meant a transition from work associated with timber management to forest and watershed restoration. As might be expected, logging and reforestation contractors expressed the need to diversify primary work activities to keep busy. Several stated that they had “started to specialize in thinning more so than just logging alone” (903970371).

We have transitioned from logging to more civil

and mechanical projects, and have performed more projects related to fish passage and wetland work (910871497).

We transitioned from a pretty much 100 percent forestland replanting company to one that now implements a wide array of watershed-landscape restoration project work (912993666).

The extent of diversification varied among businesses, and depended primarily on how focused the company was on forest and watershed management. Some contractors felt that their business had not changed much because they had not been focused on forest and watershed management work. However, most businesses, even many of those that claimed to do very little restoration work, felt as though they have changed their approach to target more of the restoration opportunities that they perceived.

We are branching out, trying to do a bunch of different things like erosion control, thinning, and other types of work versus just specializing in reforestation (903895500).

For some contractors, an active decision was necessary to diversify their work focus and broaden the scope of projects. Businesses had to make considerable changes, such as the acquisition of new or different equipment, before changes in work could happen. One business owner described it thus:

A little over two years ago, there was a conscious decision to go after this work. It takes a lot of work to do this, paper work and tracking jobs . . . and a lot of people won’t spend the time it takes to get in the program; they hire me specifically to do this type. Logging has shrunk, the market is poor, and the Forest Service isn’t releasing many real timber sales: [they are] doing a lot of stewardship work. The stewardship work is hard to make money at, and it is hard to switch over from real logging—all your equipment is geared to big saw logs and it take specialized equipment. And we are not wholly proficient at it yet, but we are seeing the writing on the wall and we are starting to make these changes. Some of the guys on the logging crew have moved

from logging to being on the construction crew to install culverts (934032279).

Like this contractor, many others also described changes in their job acquisition processes by targeting new kinds of jobs. Such changes included spending more time looking for jobs, looking for jobs farther away from their home base than they used to, searching out new avenues such as Internet sites for job postings, and bidding jobs for less.

Some of the contractors who felt as though forest and watershed management and restoration opportunities had decreased reported that their business downsized, laid off workers, and had to move into fields unrelated to forest and watershed work, such as general construction. Typically, these businesses also described an unwillingness to travel farther for jobs or go about finding them through different methods. Some mentioned that they were semiretired anyway, and the decline in opportunities just put them out of work sooner and more completely than they might have liked, but they were not willing to reinvent to keep working at the same rate.

Experiences with community-based organizations

Because watershed councils, soil and water conservation districts (SWCDs), and other local community organizations have begun to contract for forest and watershed restoration services in recent years, we asked contractors to describe their experience working with these types of organizations compared to other types of customers. Most of respondents did limited work with these groups. Only a small percentage of respondents, primarily on the technical side, did all of their work for these organizations. Nevertheless, most contractors reported positive experiences working with these types of groups.

All of these experiences have been positive. These jobs don't give us the highest margins, but we really enjoy doing the work. They are the projects that seem to feel the best, like we are doing the greatest good with the budget we have. [They are the] most positive relationships we have. They help a lot with maintaining budgets and projects, and it always becomes a partnership—they handle the political side and we handle the technical and budget issues (912851495).

We find these groups to be helpful, knowledgeable, and pleasant to work for. Furthermore, they allow the contractor to finish contracts in a timely manner with very little setbacks or delays (911992499).

Great customers, easy to work with, and they give us a lot of latitude on how to work. These projects are a relatively small part of the work that the business really does, but they are fun and interesting to work on (898126655).

Some contractors said that experiences varied considerably from one project or one council to the next.

It's 100 percent dependent on who is in charge. There are some that are very well organized and there are some that are chaotic. To make a project work, you need someone who can organize stakeholders and volunteers, especially when they have industry support (931497460).

Those that reported negative experiences indicated that low wages, slow payment, lack of knowledge about permitting and the job requirements, and too many regulations contributed to their experience. Yet for every response indicating low wages, there were a few responses indicating wages that are higher than normal among these groups.

Economic impacts of forest and watershed work

Finally, we asked contractors what they thought the economic impacts of restoration work were. In general, contractors felt that forest and watershed management work had a considerable impact on the economy through direct employment and purchases of goods and services, and by increasing environmental amenities and the provision of ecosystem services. Most respondents brought up benefits to local communities.

We are employing people in a county where there is double-digit unemployment. While we don't provide a whole lot of jobs, our business does employ people in a sector that has been hit particularly hard by the economic and political climate on management of forest resources. This business does all of the manual labor on stewardship contracts, but subcontracts out

anything that require equipment to local workers (895798508).

Noting recent economic conditions, many commented that this kind of work was “great for job creation and the local economy, especially in the face of this recession” (915670330).

Nearly all of these responses focused on local economic impact in the places where they perform restoration.

The impacts are huge—we employ a lot of people, we spend a lot of money in local communities both with labor and with supplies and materials. We have tried to set up offices in more locations so that we have a larger impact on local communities so we can be where the work is and not have to shift so many resources around (915340508).

Interviewees also identified impacts other than local hiring. Contractors frequently pointed to the economic effect of purchasing goods and services, and many of the businesses mentioned a company philosophy of buying as much locally as possible. Some of these contractors had active business plans requiring local expenditures. Contractors who worked away from home pointed out the implications of their travel on the communities where they stayed.

We don’t necessarily hire local, but the effects that we have on the local communities by coming in and paying for food and lodging is huge. In eastern Oregon—very small communities that have been hit extremely hard, for the last project we were on we had eight hotel rooms, sixteen dinners per night, all of our fuel and parts are bought there. On conservation projects that are not done with local workers, [local communities] are still benefiting from the work that is being done there via large influxes of money—hundreds and hundreds of dollars a day being pumped into the local economy. It’s doing good for the environment, but also by funding these types of programs, in an indirect way, it pumps money into the local economy. The amount of labor hours that are produced is hard to measure, but my last hotel bill was \$2,700. Multiply this by all the

projects being done around the state and it’s a huge amount of money that goes straight back to the community. We make the effort, every single time, to stay in the locally owned and operated facilities, as well as eat there, and stay away from the big chains (925940146).

In addition to hiring and supplies and services, others pointed out the environmental enhancements that would potentially bring in more money to local communities via travel and increased recreation in those areas.

Our employees stay in small towns where these types of watersheds are, and hopefully it improves fish habitat and brings in more people (904882183).

Finally, some respondents said that forest and watershed restoration work created long-term economic benefits by creating healthy and functioning ecosystems. Those noting these impacts felt passionate about the necessity to establish healthy ecosystems now, even if the positive effects were not immediately visible to profitability down the road.

Creates jobs, and puts people to work, in addition to the ecological benefits that are created and likely have economic impacts when they are fully realized (904959867).

These ecological services, if you could quantify all these jobs that are related to this area of forest and watershed work, then you would have a number that would be very, very large. So, they have a significant impact. Ecological processes lead to restoration projects, and a very large amount of money that gets spent to do these, which is useful to the environment—the protection and enhancement of natural areas prevents having to go down the endangered species path which is usually more costly and like a backwards battle (917441053).

We are the seed source for the future trees that will be planted in our watershed as part of restoration projects, so we are improving the quality of rivers and streams for the long term, which will create economic impacts in the future (899362179).

Discussion and Conclusions

The forest and watershed management and restoration businesses in this study shared several common characteristics. Nearly all of the businesses in our sample were small as defined by the Small Business Administration and more than two-thirds had less than \$1 million in annual revenue. Most business owners and managers considered their companies to be family-owned. In addition, more than 80 percent of them experience seasonal fluctuations in business and employment.

These businesses also differed in a number of other ways. In particular, businesses varied most according to their customer base. We analyzed businesses that worked primarily for federal customers, those that worked primarily for nonfederal customers, and those who were about evenly mixed. Businesses that worked primarily for federal agencies tended to be younger, perform more labor-intensive work, work more frequently away from home, and were more involved in forest and watershed management than businesses that worked primarily for nonfederal customers. Those businesses that had primarily nonfederal customers were more likely to perform equipment-intensive work, generate most of their revenue from activities outside of forest and watershed management, and work close to home.

By contrast, although we analyzed contractors that performed labor-intensive, equipment-intensive, technical, and a mix of activities, these differences did not relate to many significant differences in business characteristics. For example, we did not see statically significant differences in business age, frequency of working away from home, or levels of involvement in forest and watershed management. However, as suggested above, dominant work type and primary customer base are correlated, with labor-intensive firms more likely to work primarily for federal customers, and equipment-intensive, technical, and mixed firms more likely to have nonfederal entities as their primary customers.

Our analyses suggest that primary customer type plays a more important role in differentiating business characteristics than do dominant work activities. These findings differ from previous research, which found considerable differences based on the type of work that contractors

performed. However, these previous studies had focused only on contractors that worked for federal customers.⁴ By broadening the type of businesses examined, this study may suggest a more complex pattern than previously understood. Nevertheless, the correlation between dominant work and primary customer types suggests that future research might more deeply explore these relationships.

In addition to revealing information about the type of businesses engaged in forest and watershed restoration, our study also revealed several trends in forest and watershed management and restoration in Oregon. First, government agencies and many private landowners are managing forests and watersheds with an ecological restoration focus. This focus has led to shifts in the nature of available contract work toward active forest restoration, hazardous fuels reduction, and watershed restoration. Contracts for traditional forestry services such as reforestation practices have declined in frequency. Instead, forestry work often requires activities such as thinning, mowing, site rehabilitation, or chipping. Watershed work can include riparian and in-stream work as well as efforts to improve fish passage, manage roads, and improve water use. These projects increasingly require sophisticated technical data collection and analysis resulting in increased technical specifications and complexity of implementation. Businesses that are well equipped or have adapted to these changing opportunities tend to diversify their skills and services to capture a broader range of work and capitalize on new opportunities. Most business owners and managers that work primarily for nonfederal customers perceived these new opportunities, while those that work primarily for the federal government were less likely to identify these changes as opportunities.

Second, contractors are working in a new business environment. Business managers and owners are engaged with a different range of clients and workforce than in the past. Although contractors still perform services for federal agencies like the U.S. Forest Service and Bureau of Land Management, increasingly they are working for community-based organizations such as watershed councils that offer a new form of natural-resource governance. Contractors may find themselves working with watershed council coordinators, staff members, or soil and

water conservation districts, whereas in the past they may have worked for a more limited set of clients.

Third, contractors see themselves as contributors to rural natural-resource economies. Consistently, business owners and managers took pride in the natural-resource jobs they provide and the parts of the economy they support through local purchasing of goods and services. Many also suggested that the work they do creates longer-term

economic benefits. Business owners and managers discussed the importance of creating a healthy environment for quality of life and to attract recreation and tourism. Forest and watershed work also sustains and restores the ecosystem services that are provided by healthy ecosystems, including clean water, fish and wildlife habitat, and productive ecosystems, which contractors consistently identified as important for long-term economic prosperity.

Appendix A—Methods

DATA

To better understand the restoration industry, we collected data from owners and managers of forest and watershed restoration contracting businesses using telephone, Internet, and mail surveys. All data-collection methods included the same questions. The survey comprised closed-ended questions about business characteristics and open-ended questions about experiences conducting forest and watershed management and restoration work and trends in the industry. Specifically, we asked contractors the age of their business, the type of business, approximate average annual revenue, and whether the business is family-owned. We also asked business owners and managers about the major type of work they perform, level of involvement in the restoration industry, seasonality of their work as well as about how frequently they work far from home. Last, we asked how the forest and watershed management industry has changed in recent years, and how their business has responded to those changes.

SAMPLE

We interviewed the owners and managers of businesses that perform forest and watershed management in Oregon. There was no preexisting list of such businesses from which to draw a sample because there is no universal licensing requirements or common trade association that would have included a wide range of forest and watershed restoration businesses. Consequently, we built a sample frame from the Federal Procurement Data System (FPDS) and from invoices that watershed councils and other restoration-grant recipients submitted to the Oregon Watershed Enhancement Board.

To develop a sample of federal contractors, we created a sample frame of 1,350 contractors from the FPDS. We queried the FPDS for all contractors working for the U.S. Forest Service, Bureau of Land Management, and the U.S. Fish and Wildlife Service in Oregon between the federal fiscal years 2002 and 2008. We then stratified contractors by service codes to develop a stratified random sample of 220 contractors engaged primarily in thinning work, road construction and maintenance work, and other forestry-related activities.

To identify contractors who worked for nonfederal customers, we created a sample of contractors who were hired to implement grants awarded by the Oregon Watershed Enhancement Board (OWEB) to a variety of grant applicants. We obtained information from two databases, the Oregon Watershed Restoration Inventory (OWRI) and the OWEB Grant Management System (OGMS). In July 2009, a total of 1,457 grant projects were recorded that existed in both datasets (OWRI recorded completed grants, while OGMS records awarded grants). Of those, 447 were awarded through the board's restoration grant program. We stratified restoration grants by dominant activity and selected a stratified random sample of 116 restoration grant projects. Fiscal records for each grant project were obtained from the OWEB archives and data about each individual invoice from each grant project was entered into a database, including the contact information for each vendor. We selected all 248 vendors from each of the sampled grant projects that had performed a service for a restoration project (through pursuing contact information, we were able to determine that fifty of the sampled vendors had gone out of business).

We received responses from 101 business owners and managers originating from the FPDS sample, eighty-three originating from OWEB grants invoices, and six that occurred in both sampling frames for response rates of 49 percent and 45 percent, respectively.

PROCEDURES

We provided businesses owners and managers three options for participation in this study: phone, mail, or Internet survey, but encouraged a telephone survey. We attempted to contact all business owners and managers over the phone to ask them to participate. Nearly all participants were interviewed over the phone, with only 6 percent choosing the Internet survey and 10 percent the mail survey. All survey responses were entered into an Internet survey collector at www.surveymonkey.com.

ANALYSIS

We created two typologies of forest and watershed management contractors. First, we divided contractors based on the businesses' typical customers. We divided the sample into contractors that worked primarily for federal

Table A1. Business revenue by customer type over the past three years.

	Percent of revenue				
	Less than 25%	25–50%	50–75%	More than 75%	Total (n=190)
Federal customers					
U.S. Forest Service or Bureau of Land Management	78 (49%)	28 (18%)	16 (10%)	36 (23%)	158 (83%)
Other federal agencies	56 (82%)	11 (16%)	1 (1%)	–	68 (36%)
Nonfederal customers					
Nonindustrial private landowners	49 (48%)	18 (18%)	15 (15%)	20 (20%)	102 (54%)
Watershed councils and nonprofits	72 (72%)	21 (21%)	2 (2%)	5 (5%)	100 (53%)
Industrial landowners	55 (56%)	21 (21%)	13 (13%)	10 (10%)	99 (52%)
State agencies	62 (70%)	13 (15%)	8 (9%)	5 (6%)	88 (46%)
Others	10 (63%)	2 (13%)	1 (6%)	3 (19%)	16 (8%)

agencies, those that worked primarily for nonfederal entities, and those that worked about equally for federal and nonfederal groups. Each business was assigned a primary customer when a majority of their revenue over the past three years came from either federal or nonfederal sources. Because many businesses worked for multiple customers, when no majority existed the business was assigned to the “mixed” group (Table A1). Second, we asked respondents to identify the dominant type of work they typically perform—labor-intensive, equipment-intensive, or technical. A number of businesses responded that they do equal amounts of two or all three types of work. We used these two typologies to differentiate businesses participating in Oregon’s forest and watershed management and restoration sector. We used these typologies to examine differences among the characteristics of all businesses in the sample.

Most of the data collected for this report was categorical (e.g., primary customer, dominant work type, organizational structure, and so forth). To analyze the data, we examined the proportions of the total dataset and the proportions of each typology category using contingency tables. To test for statistically significant deviations from expected proportions, we conducted chi-square tests

with $\alpha = 0.05$ (unless otherwise noted in the text). Where no significant deviations in proportions occur in the typology categories, we only report the complete sample proportions. Where chi-square tests were significant, we report and discuss the typology categories that are substantially deviated from the expected (all-sample) proportions. We report all frequencies for the entire sample and for each typology category in the tables. In several cases where criterion variables are continuous (i.e., age of business, low-season employment, and high-season employment) we use the Tukey-Kramer multiple comparisons of means test ($\alpha = 0.05$) to examine differences between the means of each typology category. Where differences are significant at the alpha level, we report and discuss the values for each typology category, otherwise we report only the total sample means.

Finally, we examined open-ended responses about the businesses’ experiences working in forest and watershed restoration and management, changes and opportunities in the market, and perceptions of economic impacts of forest and watershed work using thematic coding. Results are discussed according to thematic codes that group businesses together along similar perceptions of the market or responses to the market.

Appendix B. Contractor Characteristics by Forest and Watershed Management Revenue

Table B1. A comparison of characteristics among contractors, based on percentage of total business revenue from forest and watershed management.

Characteristics	All contractors	Less than 25% of revenue from forest and watershed management	25–75% of revenue from forest and watershed management	Greater than 75% of revenue from forest and watershed management
Number of responses (n)***	184	75	37	72
Average business age**	22 years	27 years*	22 Years	18 years*
Sole proprietorship	52 (28%)	20 (27%)	7 (19%)	25 (35%)
Family-owned business	132 (72%)	54 (72%)	31 (84%)	47 (65%)
Small business: <\$1M Rev*	124 (70%)	41 (59%)	26 (72%)	57 (80%)
Business is seasonal	153 (83%)	56 (75%)	34 (92%)	63 (88%)
Average employment range³	11–27 jobs	9–27 jobs	25–42 jobs	7–19 jobs
Work performed				
Labor-intensive	53 (29%)	16 (21%)	8 (22%)	29 (40%)
Equipment-intensive	69 (38%)	34 (45%)	17 (46%)	18 (25%)
Technical	26 (14%)	10 (13%)	4 (11%)	12 (17%)
Mixed	36 (20%)	15 (20%)	8 (22%)	13 (18%)
Dominant customer***				
	(n=179)			
Federal agencies	52 (29%)	10 (14%)	10 (28%)	32 (44%)
Nonfederal entities	85 (47%)	45 (63%)	18 (50%)	22 (31%)
Mixed	42 (23%)	16 (23%)	8 (22%)	18 (25%)
Work within daily commute				
	(n=177)			
> 90% of the time	85 (48%)	37 (51%)	16 (47%)	32 (45%)
75–90% of the time	24 (14%)	13 (18%)	4 (12%)	7 (10%)
50–75% of the time	18 (10%)	7 (10%)	2 (6%)	9 (13%)
25–50% of the time	12 (7%)	2 (3%)	4 (12%)	6 (8%)
10–25% of the time	13 (7%)	6 (8%)	1 (3%)	6 (8%)
< 10% of the time	25 (14%)	7 (10%)	7 (21%)	11 (15%)
Hire local workers when working away from home	25 (17%)	10 (19%)	5 (19%)	10 (14%)
Equipment ownership	154 (85%)	60 (86%)	31 (84%)	61 (85%)

Note 1: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Note 2: Respondents were asked how many people worked for the business during the previous high and low seasons.

Endnotes

- 1 For a discussion of when local community organizations decide to use contractors, see Fraser MacDonald, Cassandra Moseley, Emily Jane Davis, Max Nielsen Pincus, and Autumn Elison, Mobilizing human resources for watershed restoration, EWP working #22 available at <http://ewp.uoregon.edu/publications/working>.
- 2 e.g. Cassandra Moseley, "Ethnic Differences in Job Quality among Contract Forest Workers on Six National Forests" *Policy Sciences* 39 (2):113-133, 2006.
- 3 www.fedbizopps.gov
- 4 Cassandra Moseley, "Ethnic Differences in Job Quality among Contract Forest Workers on Six National Forests" *Policy Sciences* 39 (2):113-133, 2006; Cassandra Moseley and Stacey Shankle, "Who gets the work? National forest contracting in the Pacific Northwest" *Journal of Forestry* 99 (9):32-37, 2001.

